

The comparison between BeAGLE and E665/HERMES

WAN CHANG

2019.06.12

Trigger model

❑ Scattered muon trigger (LAT):

For each charged muon (with $p_z < 0$), calculate:

$$\text{trigx} = 31.66\text{m} * p_x/p_z + 0.0283\text{ m} - q * 13.905\text{GeVm}/p_{xz}$$

$$\text{trigy} = -31.66\text{m} * p_y/p_z$$

where $q = \pm 1$ depending on the charge of the muon.

Keep events only if there is at least one muon with
 $p_z < 0 \ \&\& \ |x_{\text{trig}}| < 3.5\text{ m} \ \&\& \ |y_{\text{trig}}| < 1.5\text{m} \ \&\& \ (|x_{\text{trig}}| > 0.1\text{m} \ \vee \ |y_{\text{trig}}| > 0.1\text{m})$

❑ PCN trigger:

For each charged track ($q = \pm 1$, with $p_z < 0$), calculate:

$$x_{\text{PC}} = 6.655\text{m} * p_x/p_z + 0.0049\text{m} + 5.352\text{ q GeVm}/p_{xz}$$

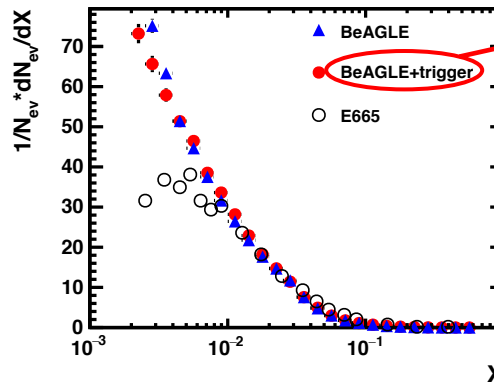
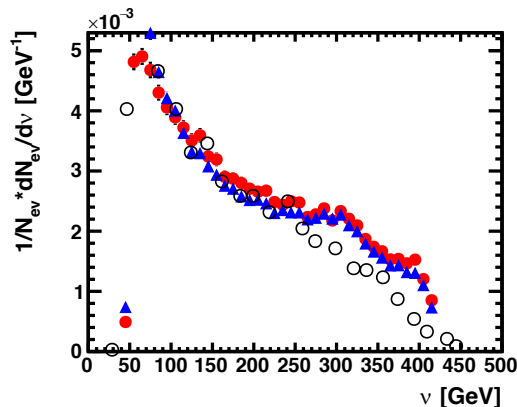
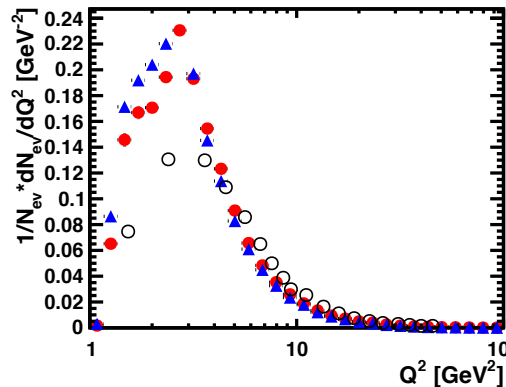
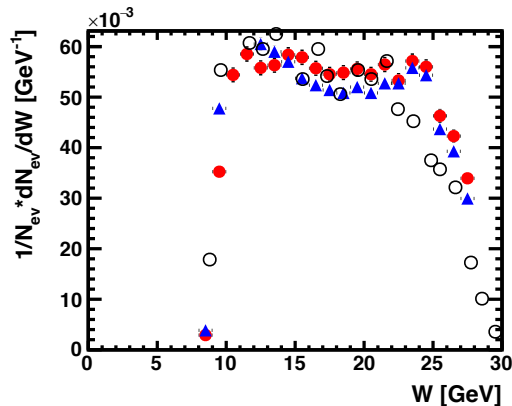
$$y_{\text{PC}} = -6.655\text{m} * p_y/p_z$$

Keep events only if there are 2 or more charged tracks which satisfy:
 $p_z < 0 \ \&\& \ 0.096\text{m} < |x_{\text{PC}}| < 1.0\text{m} \ \&\& \ |y_{\text{PC}}| < 1.0\text{ m}$

The comparison of event kinematic distribution

$\mu^+ + \text{Xe}$

Beam momentum: 490 GeV \times 0 GeV



$0.1 < y < 0.85$

$1.0 < Q^2 < 100$

$0.0035 \text{ rad} < \theta < 6.29 \text{ rad}$

$8 < W < 30 \text{ GeV}$

$X > 0.002$

40K events

pdf: CTEQ6

qhat=0, genShd=3

With LAT+PCN trigger

Event count

Total event : 40000

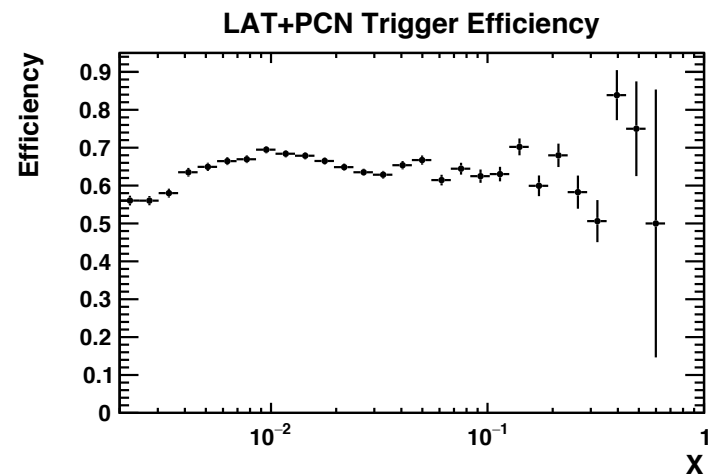
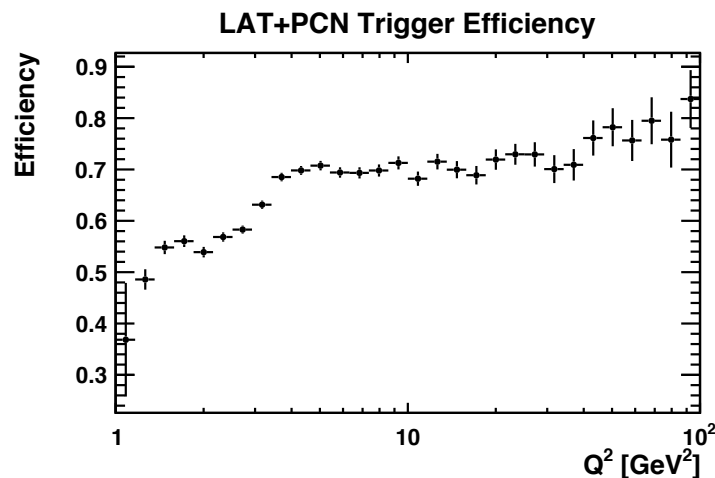
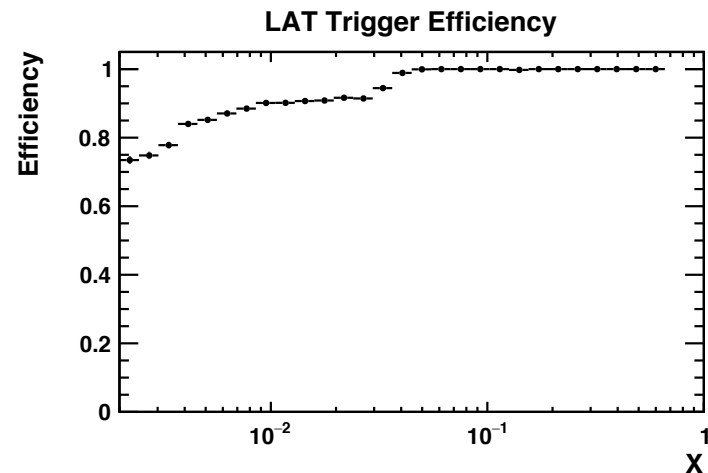
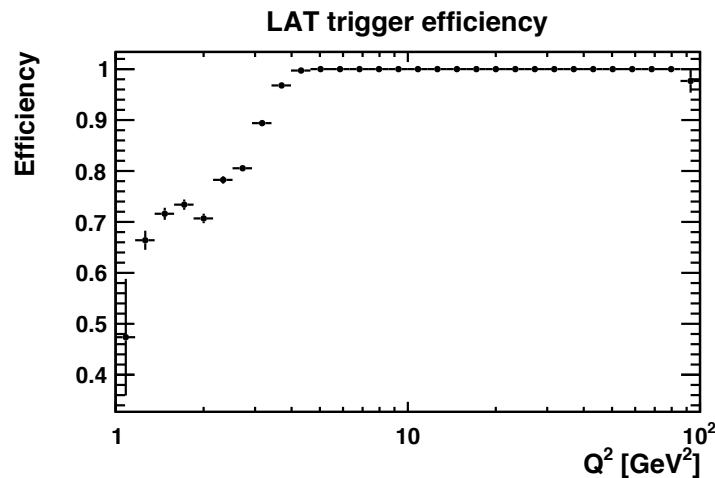
Without trigger: 37909

With LAT trigger: 34139

With LAT+PCN trigger: 24431

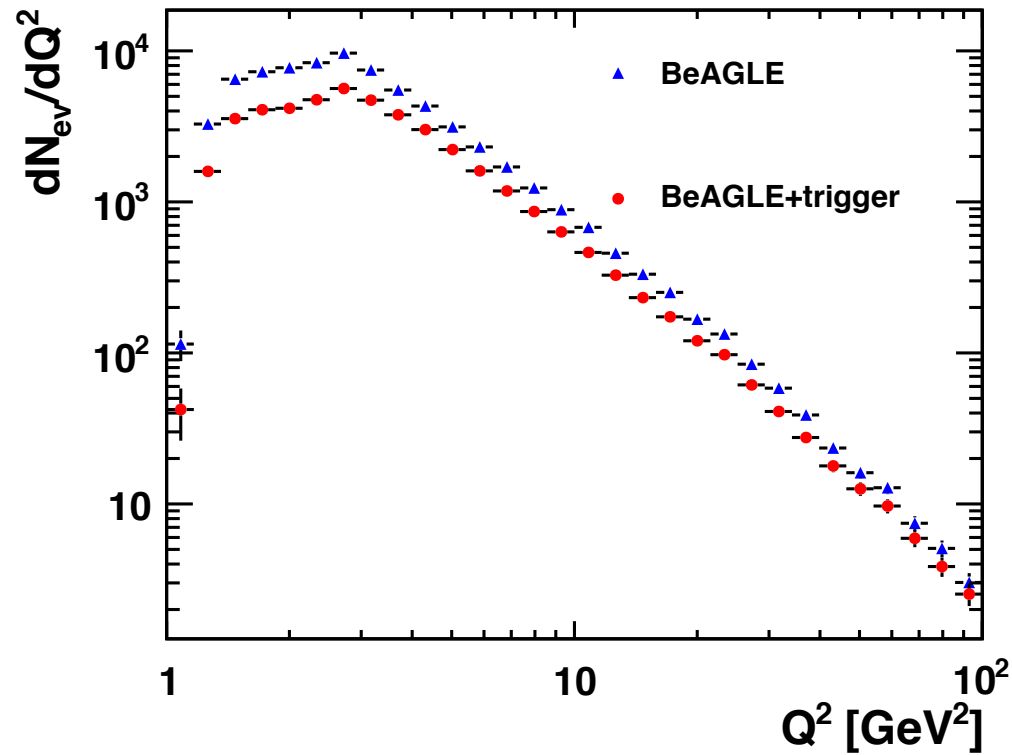
It seems like no improvements ???

The efficiency of LAT trigger and LAT+PCN trigger



- The LAT trigger works in the lower Q^2 and lower X region. The efficiency goes to 1 at higher Q^2 and higher X.
- The triggers work, especially in the lower Q^2 and lower X region.

The event Q^2 distribution without normalization by N_{ev}



The Q^2 effect goes in the right direction, but is not strong enough.

To do...

- IR plots after improvement
- DPMJET vs. E665 plots (without a trigger)
- Additional trigger plots (as Mark mentioned in the email)